

```
In [1]: from ultralytics import YOLO
```

```
# Load YOLOv8 (nano version, fastest for beginners)
model = YOLO("yolov8n.pt")
```

```
In [2]: results = model("https://ultralytics.com/images/bus.jpg")
results[0].show()
```

```
Found https://ultralytics.com/images/bus.jpg locally at bus.jpg
image 1/1 C:\Users\HP\bus.jpg: 640x480 4 persons, 1 bus, 1 stop sign, 388.0ms
Speed: 7.4ms preprocess, 388.0ms inference, 4.7ms postprocess per image at shape
(1, 3, 640, 480)
```

```
In [3]: results[0].save(filename="bus_output.jpg")
```

```
Out[3]: 'bus_output.jpg'
```

```
In [4]: # Train YOLO on small dataset (coco128)
model.train(data="coco128.yaml", epochs=3, imgsz=640)
```

Ultralytics 8.3.189 Python-3.9.23 torch-2.8.0+cpu CPU (12th Gen Intel Core(TM) i5-1240P)

engine\trainer: agnostic_nms=False, amp=True, augment=False, auto_augment=randaugment, batch=16, bgr=0.0, box=7.5, cache=False, cfg=None, classes=None, close_mosaic=10, cls=0.5, conf=None, copy_paste=0.0, copy_paste_mode=flip, cos_lr=False, cutmix=0.0, data=coco128.yaml, degrees=0.0, deterministic=True, device=cpu, df1=1.5, dnn=False, dropout=0.0, dynamic=False, embed=None, epochs=3, erasing=0.4, exist_ok=False, fliplr=0.5, flipud=0.0, format=torchscript, fraction=1.0, freeze=None, half=False, hsv_h=0.015, hsv_s=0.7, hsv_v=0.4, imgsz=640, int8=False, iou=0.7, keras=False, kobj=1.0, line_width=None, lr0=0.01, lrf=0.01, mask_ratio=4, max_det=300, mixup=0.0, mode=train, model=yolov8n.pt, momentum=0.937, mosaic=1.0, multi_scale=False, name=train3, nbs=64, nms=False, opset=None, optimize=False, optimize_r=auto, overlap_mask=True, patience=100, perspective=0.0, plots=True, pose=12.0, pretrained=True, profile=False, project=None, rect=False, resume=False, retina_masks=False, save=True, save_conf=False, save_crop=False, save_dir=runs\detect\train3, save_frames=False, save_json=False, save_period=-1, save_txt=False, scale=0.5, seed=0, shear=0.0, show=False, show_boxes=True, show_conf=True, show_labels=True, simplify=True, single_cls=False, source=None, split=val, stream_buffer=False, task=detect, time=None, tracker=botsort.yaml, translate=0.1, val=True, verbose=True, vid_stride=1, visualize=False, warmup_bias_lr=0.1, warmup_epochs=3.0, warmup_momentum=0.8, weight_decay=0.0005, workers=8, workspace=None

	from	n	params	module
arguments				
0		-1	1	464 ultralytics.nn.modules.conv.Conv
[3, 16, 3, 2]				
1		-1	1	4672 ultralytics.nn.modules.conv.Conv
[16, 32, 3, 2]				
2		-1	1	7360 ultralytics.nn.modules.block.C2f
[32, 32, 1, True]				
3		-1	1	18560 ultralytics.nn.modules.conv.Conv
[32, 64, 3, 2]				
4		-1	2	49664 ultralytics.nn.modules.block.C2f
[64, 64, 2, True]				
5		-1	1	73984 ultralytics.nn.modules.conv.Conv
[64, 128, 3, 2]				
6		-1	2	197632 ultralytics.nn.modules.block.C2f
[128, 128, 2, True]				
7		-1	1	295424 ultralytics.nn.modules.conv.Conv
[128, 256, 3, 2]				
8		-1	1	460288 ultralytics.nn.modules.block.C2f
[256, 256, 1, True]				
9		-1	1	164608 ultralytics.nn.modules.block.SPPF
[256, 256, 5]				
10		-1	1	0 torch.nn.modules.upsampling.Upsample
[None, 2, 'nearest']				
11		[-1, 6]	1	0 ultralytics.nn.modules.conv.Concat
[1]				
12		-1	1	148224 ultralytics.nn.modules.block.C2f
[384, 128, 1]				
13		-1	1	0 torch.nn.modules.upsampling.Upsample
[None, 2, 'nearest']				
14		[-1, 4]	1	0 ultralytics.nn.modules.conv.Concat
[1]				
15		-1	1	37248 ultralytics.nn.modules.block.C2f
[192, 64, 1]				
16		-1	1	36992 ultralytics.nn.modules.conv.Conv
[64, 64, 3, 2]				
17		[-1, 12]	1	0 ultralytics.nn.modules.conv.Concat
[1]				

```

18           -1  1    123648 ultralytics.nn.modules.block.C2f
[192, 128, 1]
19           -1  1    147712 ultralytics.nn.modules.conv.Conv
[128, 128, 3, 2]
20          [-1, 9] 1      0 ultralytics.nn.modules.conv.Concat
[1]
21           -1  1    493056 ultralytics.nn.modules.block.C2f
[384, 256, 1]
22          [15, 18, 21] 1    897664 ultralytics.nn.modules.head.Detect
[80, [64, 128, 256]]
Model summary: 129 layers, 3,157,200 parameters, 3,157,184 gradients, 8.9 GFLOPs

```

Transferred 70/355 items from pretrained weights
Freezing layer 'model.22.dfl.conv.weight'
train: Fast image access (ping: 0.30.1 ms, read: 40.614.4 MB/s, size: 50.9 KB)
train: Scanning C:\Users\HP\datasets\coco128\labels\train2017.cache... 126 images, 2 backgrounds, 0 corrupt: 100% ————— 128/128 16244.2it/s 0.0s
val: Fast image access (ping: 0.10.0 ms, read: 35.614.2 MB/s, size: 52.5 KB)
val: Scanning C:\Users\HP\datasets\coco128\labels\train2017.cache... 126 images, 2 backgrounds, 0 corrupt: 100% ————— 128/128 0.0s
Plotting labels to runs\detect\train3\labels.jpg...
optimizer: 'optimizer=auto' found, ignoring 'lr0=0.01' and 'momentum=0.937' and determining best 'optimizer', 'lr0' and 'momentum' automatically...
optimizer: AdamW(lr=0.000119, momentum=0.9) with parameter groups 57 weight(decay=0.0), 64 weight(decay=0.0005), 63 bias(decay=0.0)
Image sizes 640 train, 640 val
Using 0 dataloader workers
Logging results to runs\detect\train3
Starting training for 3 epochs...

Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
1/3	0G	3.008	4.901	2.54	285	640: 10
0%	————— 8/8 0.11it/s 1:14s					
P50-95):	25%	Class Images Instances Box(P R mAP50 mA				
P50-95):	50%	————— 1/4 0.04it/s 7.9sWARNING NMS time limit 3.600s exceeded				
P50-95):	75%	Class Images Instances Box(P R mAP50 mA				
P50-95):	100%	————— 2/4 0.06it/s 16.8sWARNING NMS time limit 3.600s exceeded				
		Class Images Instances Box(P R mAP50 mA				
		————— 3/4 0.07it/s 26.8sWARNING NMS time limit 3.600s exceeded				
		Class Images Instances Box(P R mAP50 mA				
		————— 4/4 0.11it/s 36.0s				
		all 128 929 0.0145 0.000776 9.56e-05				
		2.11e-05				

Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size
2/3	0G	2.914	4.637	2.524	256	640: 10
0%	————— 8/8 0.12it/s 1:09s					
P50-95):	25%	Class Images Instances Box(P R mAP50 mA				
P50-95):	50%	————— 1/4 0.04it/s 7.4sWARNING NMS time limit 3.600s exceeded				
P50-95):	75%	Class Images Instances Box(P R mAP50 mA				
P50-95):	100%	————— 2/4 0.06it/s 16.0sWARNING NMS time limit 3.600s exceeded				
		Class Images Instances Box(P R mAP50 mA				
		————— 3/4 0.07it/s 26.0sWARNING NMS time limit 3.600s exceeded				
		Class Images Instances Box(P R mAP50 mA				
		————— 4/4 0.11it/s 35.0s				
		all 128 929 2.53e-05 0.00344 7.36e-05				
		1.81e-05				

Epoch	GPU_mem	box_loss	cls_loss	dfl_loss	Instances	Size	
	3/3	0G	2.978	4.777	2.52	204	640: 10
0%	—————	8/8 0.11it/s 1:10s					
P50-95): 25%	—————	Class	Images	Instances	Box(P	R	mAP50 mA
P50-95): 50%	—————	Class	Images	Instances	Box(P	R	mAP50 mA
P50-95): 75%	—————	Class	Images	Instances	Box(P	R	mAP50 mA
P50-95): 100%	—————	Class	Images	Instances	Box(P	R	mAP50 mA
		all	128	929	2.83e-05	0.0036	8.34e-05
							2.1e-05

3 epochs completed in 0.090 hours.

Optimizer stripped from runs\detect\train3\weights\last.pt, 6.5MB

Optimizer stripped from runs\detect\train3\weights\best.pt, 6.5MB

Validating runs\detect\train3\weights\best.pt...

Ultralytics 8.3.189 Python-3.9.23 torch-2.8.0+cpu CPU (12th Gen Intel Core(TM) i5-1240P)

Model summary (fused): 72 layers, 3,151,904 parameters, 0 gradients, 8.7 GFLOPs

Class	Images	Instances	Box(P	R	mAP50	mA	
P50-95): 25%	—————	1/4 0.04it/s 6.7sWARNING NMS time limit 3.600s exceeded					
P50-95): 50%	—————	Class	Images	Instances	Box(P	R	mAP50 mA
P50-95): 75%	—————	Class	Images	Instances	Box(P	R	mAP50 mA
P50-95): 100%	—————	Class	Images	Instances	Box(P	R	mAP50 mA
		all	128	929	3.07e-05	0.0041	9.31e-05
							2.42e-05

0.00172	person	61	254	0.00218	0.291	0.00661
0	bicycle	3	6	0	0	0
0	car	12	46	0	0	0
0	motorcycle	4	5	0	0	0
0	airplane	5	6	0	0	0
0	bus	5	7	0	0	0
0	train	3	3	0	0	0
0	truck	5	12	0	0	0
0	boat	2	6	0	0	0
0	traffic light	4	14	0	0	0
0	stop sign	2	2	0	0	0

0	bench	5	9	0	0	0
0	bird	2	16	0	0	0
0	cat	4	4	0	0	0
0	dog	9	9	0	0	0
0	horse	1	2	0	0	0
0	elephant	4	17	0	0	0
0	bear	1	1	0	0	0
0	zebra	2	4	0	0	0
0	giraffe	4	9	0	0	0
0	backpack	4	6	0	0	0
0	umbrella	4	18	0	0	0
0	handbag	9	19	0	0	0
0	tie	6	7	0	0	0
0	suitcase	2	4	0	0	0
0	frisbee	5	5	0	0	0
0	skis	1	1	0	0	0
0	snowboard	2	7	0	0	0
0	sports ball	6	6	0	0	0
0	kite	2	10	0	0	0
0	baseball bat	4	4	0	0	0
0	baseball glove	4	7	0	0	0
0	skateboard	3	5	0	0	0
0	tennis racket	5	7	0	0	0
0	bottle	6	18	0	0	0
0	wine glass	5	16	0	0	0
0	cup	10	36	0	0	0
0	fork	6	6	0	0	0
0	knife	7	16	0	0	0
0	spoon	5	22	0	0	0
0	bowl	9	28	0	0	0

0	banana	1	1	0	0	0
0	sandwich	2	2	0	0	0
0	orange	1	4	0	0	0
0	broccoli	4	11	0	0	0
0	carrot	3	24	0	0	0
0	hot dog	1	2	0	0	0
0	pizza	5	5	0	0	0
0	donut	2	14	0	0	0
0	cake	4	4	0	0	0
0	chair	9	35	0	0	0
0	couch	5	6	0	0	0
0	potted plant	9	14	0	0	0
0	bed	3	3	0	0	0
0	dining table	10	13	0	0	0
0	toilet	2	2	0	0	0
0	tv	2	2	0	0	0
0	laptop	2	3	0	0	0
0	mouse	2	2	0	0	0
0	remote	5	8	0	0	0
0	cell phone	5	8	0	0	0
0	microwave	3	3	0	0	0
0	oven	5	5	0	0	0
0	sink	4	6	0	0	0
0	refrigerator	5	5	0	0	0
0	book	6	29	0	0	0
0	clock	8	9	0	0	0
0	vase	2	2	0	0	0
0	scissors	1	1	0	0	0
0	teddy bear	6	21	0	0	0
0	toothbrush	2	5	0	0	0

0
Speed: 1.6ms preprocess, 108.2ms inference, 0.0ms loss, 115.2ms postprocess per image
Results saved to **runs\detect\train3**

Out[4]: ultralytics.utils.metrics.DetMetrics object with attributes:

```

ap_class_index: array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 11, 13, 14, 15,
16, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38,
39, 40, 41, 42, 43, 44, 45, 46, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59,
60, 61, 62, 63, 64, 65, 67, 68, 69, 71, 72, 73, 74, 75, 76, 77, 79])
box: ultralytics.utils.metrics.Metric object
confusion_matrix: <ultralytics.utils.metrics.ConfusionMatrix object at 0x0000002
262E03A7C0>
curves: ['Precision-Recall(B)', 'F1-Confidence(B)', 'Precision-Confidence(B)', 'Recall-Confidence(B)']
curves_results: [[array([
  0, 0.001001, 0.002002, 0.003003,
  0.004004, 0.005005, 0.006006, 0.007007, 0.008008, 0.009009,
  0.01001, 0.011011, 0.012012, 0.013013, 0.014014, 0.015015, 0.
  016016, 0.017017, 0.018018, 0.019019, 0.02002, 0.021021, 0.0
  22022, 0.023023,
  0.024024, 0.025025, 0.026026, 0.027027, 0.028028, 0.02
  9029, 0.03003, 0.031031, 0.032032, 0.033033, 0.034034, 0.035
  035, 0.036036, 0.037037, 0.038038, 0.039039, 0.04004, 0.0410
  41, 0.042042, 0.043043, 0.044044, 0.045045, 0.046046, 0.04704
  7,
  0.048048, 0.049049, 0.05005, 0.051051, 0.052052, 0.05
  3053, 0.054054, 0.055055, 0.056056, 0.057057, 0.058058, 0.059
  059, 0.06006, 0.061061, 0.062062, 0.063063, 0.064064, 0.0650
  65, 0.066066, 0.067067, 0.068068, 0.069069, 0.07007, 0.07107
  1,
  0.072072, 0.073073, 0.074074, 0.075075, 0.076076, 0.07
  7077, 0.078078, 0.079079, 0.08008, 0.081081, 0.082082, 0.083
  083, 0.084084, 0.085085, 0.086086, 0.087087, 0.088088, 0.0890
  89, 0.09009, 0.091091, 0.092092, 0.093093, 0.094094, 0.09509
  5,
  0.096096, 0.097097, 0.098098, 0.099099, 0.1001, 0.
  1011, 0.1021, 0.1031, 0.1041, 0.10511, 0.10611, 0.10
  711, 0.10811, 0.10911, 0.11011, 0.11111, 0.11211, 0.113
  11, 0.11411, 0.11512, 0.11612, 0.11712, 0.11812, 0.1191
  2,
  0.12012, 0.12112, 0.12212, 0.12312, 0.12412, 0.1
  2513, 0.12613, 0.12713, 0.12813, 0.12913, 0.13013, 0.13
  113, 0.13213, 0.13313, 0.13413, 0.13514, 0.13614, 0.137
  14, 0.13814, 0.13914, 0.14014, 0.14114, 0.14214, 0.1431
  4,
  0.14414, 0.14515, 0.14615, 0.14715, 0.14815, 0.1
  4915, 0.15015, 0.15115, 0.15215, 0.15315, 0.15415, 0.15
  516, 0.15616, 0.15716, 0.15816, 0.15916, 0.16016, 0.161
  16, 0.16216, 0.16316, 0.16416, 0.16517, 0.16617, 0.1671
  7,
  0.16817, 0.16917, 0.17017, 0.17117, 0.17217, 0.1
  7317, 0.17417, 0.17518, 0.17618, 0.17718, 0.17818, 0.17
  918, 0.18018, 0.18118, 0.18218, 0.18318, 0.18418, 0.185
  19, 0.18619, 0.18719, 0.18819, 0.18919, 0.19019, 0.1911
  9,
  0.19219, 0.19319, 0.19419, 0.1952, 0.1962, 0.
  1972, 0.1982, 0.1992, 0.2002, 0.2012, 0.2022, 0.2
  032, 0.2042, 0.20521, 0.20621, 0.20721, 0.20821, 0.209
  21, 0.21021, 0.21121, 0.21221, 0.21321, 0.21421, 0.2152
  2,
  0.21622, 0.21722, 0.21822, 0.21922, 0.22022, 0.2
  2122, 0.22222, 0.22322, 0.22422, 0.22523, 0.22623, 0.22
  723, 0.22823, 0.22923, 0.23023, 0.23123, 0.23223, 0.233
  23, 0.23423, 0.23524, 0.23624, 0.23724, 0.23824, 0.2392
]
```

4,	0.24024,	0.24124,	0.24224,	0.24324,	0.24424,	0.2
4525,	0.24625,	0.24725,	0.24825,	0.24925,	0.25025,	0.25
125,	0.25225,	0.25325,	0.25425,	0.25526,	0.25626,	0.257
26,	0.25826,	0.25926,	0.26026,	0.26126,	0.26226,	0.2632
6,	0.26426,	0.26527,	0.26627,	0.26727,	0.26827,	0.2
6927,	0.27027,	0.27127,	0.27227,	0.27327,	0.27427,	0.27
528,	0.27628,	0.27728,	0.27828,	0.27928,	0.28028,	0.281
28,	0.28228,	0.28328,	0.28428,	0.28529,	0.28629,	0.2872
9,	0.28829,	0.28929,	0.29029,	0.29129,	0.29229,	0.2
9329,	0.29429,	0.2953,	0.2963,	0.2973,	0.2983,	0.2
993,	0.3003,	0.3013,	0.3023,	0.3033,	0.3043,	0.305
31,	0.30631,	0.30731,	0.30831,	0.30931,	0.31031,	0.3113
1,	0.31231,	0.31331,	0.31431,	0.31532,	0.31632,	0.3
1732,	0.31832,	0.31932,	0.32032,	0.32132,	0.32232,	0.32
332,	0.32432,	0.32533,	0.32633,	0.32733,	0.32833,	0.329
33,	0.33033,	0.33133,	0.33233,	0.33333,	0.33433,	0.3353
4,	0.33634,	0.33734,	0.33834,	0.33934,	0.34034,	0.3
4134,	0.34234,	0.34334,	0.34434,	0.34535,	0.34635,	0.34
735,	0.34835,	0.34935,	0.35035,	0.35135,	0.35235,	0.353
35,	0.35435,	0.35536,	0.35636,	0.35736,	0.35836,	0.3593
6,	0.36036,	0.36136,	0.36236,	0.36336,	0.36436,	0.3
6537,	0.36637,	0.36737,	0.36837,	0.36937,	0.37037,	0.37
137,	0.37237,	0.37337,	0.37437,	0.37538,	0.37638,	0.377
38,	0.37838,	0.37938,	0.38038,	0.38138,	0.38238,	0.3833
8,	0.38438,	0.38539,	0.38639,	0.38739,	0.38839,	0.3
8939,	0.39039,	0.39139,	0.39239,	0.39339,	0.39439,	0.3
954,	0.3964,	0.3974,	0.3984,	0.3994,	0.4004,	0.40
14,	0.4024,	0.4034,	0.4044,	0.40541,	0.40641,	0.4074
1,	0.40841,	0.40941,	0.41041,	0.41141,	0.41241,	0.4
1341,	0.41441,	0.41542,	0.41642,	0.41742,	0.41842,	0.41
942,	0.42042,	0.42142,	0.42242,	0.42342,	0.42442,	0.425
43,	0.42643,	0.42743,	0.42843,	0.42943,	0.43043,	0.4314
3,	0.43243,	0.43343,	0.43443,	0.43544,	0.43644,	0.4
3744,	0.43844,	0.43944,	0.44044,	0.44144,	0.44244,	0.44
344,	0.44444,	0.44545,	0.44645,	0.44745,	0.44845,	0.449
45,	0.45045,	0.45145,	0.45245,	0.45345,	0.45445,	0.4554
6,	0.45646,	0.45746,	0.45846,	0.45946,	0.46046,	0.4
6146,	0.46246,	0.46346,	0.46446,	0.46547,	0.46647,	0.46
747,	0.46847,	0.46947,	0.47047,	0.47147,	0.47247,	0.473
47,	0.47447,	0.47548,	0.47648,	0.47748,	0.47848,	0.4794
8,	0.48048,	0.48148,	0.48248,	0.48348,	0.48448,	0.4
8549,	0.48649,	0.48749,	0.48849,	0.48949,	0.49049,	0.49
149,	0.49249,	0.49349,	0.49449,	0.4955,	0.4965,	0.49
75,	0.4985,	0.4995,	0.5005,	0.5015,	0.5025,	0.503
5,	0.5045,	0.50551,	0.50651,	0.50751,	0.50851,	0.5
0951,	0.51051,	0.51151,	0.51251,	0.51351,	0.51451,	0.51
552,	0.51652,	0.51752,	0.51852,	0.51952,	0.52052,	0.521
52,	0.52252,	0.52352,	0.52452,	0.52553,	0.52653,	0.5275

3,	0.52853,	0.52953,	0.53053,	0.53153,	0.53253,	0.5
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volo project

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76,	0.76276,	0.76376,	0.76476,	0.76577,	0.76677,	0.7677
7,	0.76877,	0.76977,	0.77077,	0.77177,	0.77277,	0.7
7377,	0.77477,	0.77578,	0.77678,	0.77778,	0.77878,	0.77
978,	0.78078,	0.78178,	0.78278,	0.78378,	0.78478,	0.785
79,	0.78679,	0.78779,	0.78879,	0.78979,	0.79079,	0.7917
9,	0.79279,	0.79379,	0.79479,	0.7958,	0.7968,	0.
7978,	0.7988,	0.7998,	0.8008,	0.8018,	0.8028,	0.8
038,	0.8048,	0.80581,	0.80681,	0.80781,	0.80881,	0.809

volo project

81, 2,	0.81081,	0.81181,	0.81281,	0.81381,	0.81481,	0.8158	
2182,	0.81682,	0.81782,	0.81882,	0.81982,	0.82082,	0.8	
783,	0.82282,	0.82382,	0.82482,	0.82583,	0.82683,	0.82	
83, 4,	0.82883,	0.82983,	0.83083,	0.83183,	0.83283,	0.833	
4585,	0.83483,	0.83584,	0.83684,	0.83784,	0.83884,	0.8398	
185,	0.84084,	0.84184,	0.84284,	0.84384,	0.84484,	0.8	
86, 6,	0.84485,	0.84785,	0.84885,	0.84985,	0.85085,	0.85	
588,	0.85285,	0.85385,	0.85485,	0.85586,	0.85686,	0.857	
88, 9,	0.85886,	0.85986,	0.86086,	0.86186,	0.86286,	0.8638	
6987,	0.86486,	0.86587,	0.86687,	0.86787,	0.86887,	0.8	
588,	0.87087,	0.87187,	0.87287,	0.87387,	0.87487,	0.87	
88, 9,	0.87688,	0.87788,	0.87888,	0.87988,	0.88088,	0.881	
9389,	0.88288,	0.88388,	0.88488,	0.88589,	0.88689,	0.8878	
999, 91, 1,	0.88889,	0.88989,	0.89089,	0.89189,	0.89289,	0.8	
1792,	0.89489,	0.8959,	0.8969,	0.8979,	0.8989,	0.8	
392,	0.9009,	0.9019,	0.9029,	0.9039,	0.9049,	0.905	
93, 4,	0.90691,	0.90791,	0.90891,	0.90991,	0.91091,	0.9119	
1792, 795, 95, 6,	0.91291,	0.91391,	0.91491,	0.91592,	0.91692,	0.9	
392,	0.91892,	0.91992,	0.92092,	0.92192,	0.92292,	0.92	
93, 4,	0.92492,	0.92593,	0.92693,	0.92793,	0.92893,	0.929	
4194, 795, 95, 6,	0.93093,	0.93193,	0.93293,	0.93393,	0.93493,	0.9359	
6597, 197, 98, 8,	0.93694,	0.93794,	0.93894,	0.93994,	0.94094,	0.9	
197, 98, 8,	0.94294,	0.94394,	0.94494,	0.94595,	0.94695,	0.94	
0.94895,	0.94995,	0.95095,	0.95195,	0.95295,	0.95395		
0.95495,	0.95596,	0.95696,	0.95796,	0.95896,	0.9599		
6597, 197, 98, 8,	0.96096,	0.96196,	0.96296,	0.96396,	0.96496,	0.9	
0.96697,	0.96797,	0.96897,	0.96997,	0.97097,	0.97197,	0.97	
0.97297,	0.97397,	0.97497,	0.97598,	0.97698,	0.97798,	0.977	
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2,	0.021021,	0.022022,	0.023023,	0.024024,	0.025025,	0.026026,	
9029,	0.03003,	0.031031,	0.032032,	0.033033,	0.034034,	0.035	
035,	0.036036,	0.037037,	0.038038,	0.039039,	0.04004,	0.0410	
41,	0.042042,	0.043043,	0.044044,	0.045045,	0.046046,	0.04704	

7,	0.048048,	0.049049,	0.05005,	0.051051,	0.052052,	0.05
3053,	0.054054,	0.055055,	0.056056,	0.057057,	0.058058,	0.059
059,	0.06006,	0.061061,	0.062062,	0.063063,	0.064064,	0.0650
65,	0.066066,	0.067067,	0.068068,	0.069069,	0.07007,	0.07107
1,	0.072072,	0.073073,	0.074074,	0.075075,	0.076076,	0.07
7077,	0.078078,	0.079079,	0.08008,	0.081081,	0.082082,	0.083
083,	0.084084,	0.085085,	0.086086,	0.087087,	0.088088,	0.0890
89,	0.09009,	0.091091,	0.092092,	0.093093,	0.094094,	0.09509
5,	0.096096,	0.097097,	0.098098,	0.099099,	0.1001,	0.
1011,	0.1021,	0.1031,	0.1041,	0.10511,	0.10611,	0.10
711,	0.10811,	0.10911,	0.11011,	0.11111,	0.11211,	0.113
11,	0.11411,	0.11512,	0.11612,	0.11712,	0.11812,	0.1191
2,	0.12012,	0.12112,	0.12212,	0.12312,	0.12412,	0.1
2513,	0.12613,	0.12713,	0.12813,	0.12913,	0.13013,	0.13
113,	0.13213,	0.13313,	0.13413,	0.13514,	0.13614,	0.137
14,	0.13814,	0.13914,	0.14014,	0.14114,	0.14214,	0.1431
4,	0.14414,	0.14515,	0.14615,	0.14715,	0.14815,	0.1
4915,	0.15015,	0.15115,	0.15215,	0.15315,	0.15415,	0.15
516,	0.15616,	0.15716,	0.15816,	0.15916,	0.16016,	0.161
16,	0.16216,	0.16316,	0.16416,	0.16517,	0.16617,	0.1671
7,	0.16817,	0.16917,	0.17017,	0.17117,	0.17217,	0.1
7317,	0.17417,	0.17518,	0.17618,	0.17718,	0.17818,	0.17
918,	0.18018,	0.18118,	0.18218,	0.18318,	0.18418,	0.185
19,	0.18619,	0.18719,	0.18819,	0.18919,	0.19019,	0.1911
9,	0.19219,	0.19319,	0.19419,	0.1952,	0.1962,	0.
1972,	0.1982,	0.1992,	0.2002,	0.2012,	0.2022,	0.2
032,	0.2042,	0.20521,	0.20621,	0.20721,	0.20821,	0.209
21,	0.21021,	0.21121,	0.21221,	0.21321,	0.21421,	0.2152
2,	0.21622,	0.21722,	0.21822,	0.21922,	0.22022,	0.2
2122,	0.22222,	0.22322,	0.22422,	0.22523,	0.22623,	0.22
723,	0.22823,	0.22923,	0.23023,	0.23123,	0.23223,	0.233
23,	0.23423,	0.23524,	0.23624,	0.23724,	0.23824,	0.2392
4,	0.24024,	0.24124,	0.24224,	0.24324,	0.24424,	0.2
4525,	0.24625,	0.24725,	0.24825,	0.24925,	0.25025,	0.25
125,	0.25225,	0.25325,	0.25425,	0.25526,	0.25626,	0.257
26,	0.25826,	0.25926,	0.26026,	0.26126,	0.26226,	0.2632
6,	0.26426,	0.26527,	0.26627,	0.26727,	0.26827,	0.2
6927,	0.27027,	0.27127,	0.27227,	0.27327,	0.27427,	0.27
528,	0.27628,	0.27728,	0.27828,	0.27928,	0.28028,	0.281
28,	0.28228,	0.28328,	0.28428,	0.28529,	0.28629,	0.2872
9,	0.28829,	0.28929,	0.29029,	0.29129,	0.29229,	0.2
9329,	0.29429,	0.2953,	0.2963,	0.2973,	0.2983,	0.2
993,	0.3003,	0.3013,	0.3023,	0.3033,	0.3043,	0.305
31,	0.30631,	0.30731,	0.30831,	0.30931,	0.31031,	0.3113
1,	0.31231,	0.31331,	0.31431,	0.31532,	0.31632,	0.3
1732,	0.31832,	0.31932,	0.32032,	0.32132,	0.32232,	0.32
332,	0.32432,	0.32533,	0.32633,	0.32733,	0.32833,	0.329
33,	0.33033,	0.33133,	0.33233,	0.33333,	0.33433,	0.3353

4,	0.33634,	0.33734,	0.33834,	0.33934,	0.34034,	0.3
4134,	0.34234,	0.34334,	0.34434,	0.34535,	0.34635,	0.34
735,	0.34835,	0.34935,	0.35035,	0.35135,	0.35235,	0.353
35,	0.35435,	0.35536,	0.35636,	0.35736,	0.35836,	0.3593
6,	0.36036,	0.36136,	0.36236,	0.36336,	0.36436,	0.3
6537,	0.36637,	0.36737,	0.36837,	0.36937,	0.37037,	0.37
137,	0.37237,	0.37337,	0.37437,	0.37538,	0.37638,	0.377
38,	0.37838,	0.37938,	0.38038,	0.38138,	0.38238,	0.3833
8,	0.38438,	0.38539,	0.38639,	0.38739,	0.38839,	0.3
8939,	0.39039,	0.39139,	0.39239,	0.39339,	0.39439,	0.3
954,	0.3964,	0.3974,	0.3984,	0.3994,	0.4004,	0.40
14,	0.4024,	0.4034,	0.4044,	0.40541,	0.40641,	0.4074
1,	0.40841,	0.40941,	0.41041,	0.41141,	0.41241,	0.4
1341,	0.41441,	0.41542,	0.41642,	0.41742,	0.41842,	0.41
942,	0.42042,	0.42142,	0.42242,	0.42342,	0.42442,	0.425
43,	0.42643,	0.42743,	0.42843,	0.42943,	0.43043,	0.4314
3,	0.43243,	0.43343,	0.43443,	0.43544,	0.43644,	0.4
3744,	0.43844,	0.43944,	0.44044,	0.44144,	0.44244,	0.44
344,	0.44444,	0.44545,	0.44645,	0.44745,	0.44845,	0.449
45,	0.45045,	0.45145,	0.45245,	0.45345,	0.45445,	0.4554
6,	0.45646,	0.45746,	0.45846,	0.45946,	0.46046,	0.4
6146,	0.46246,	0.46346,	0.46446,	0.46547,	0.46647,	0.46
747,	0.46847,	0.46947,	0.47047,	0.47147,	0.47247,	0.473
47,	0.47447,	0.47548,	0.47648,	0.47748,	0.47848,	0.4794
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8549,	0.48649,	0.48749,	0.48849,	0.48949,	0.49049,	0.49
149,	0.49249,	0.49349,	0.49449,	0.4955,	0.4965,	0.49
75,	0.4985,	0.4995,	0.5005,	0.5015,	0.5025,	0.503
5,	0.5045,	0.50551,	0.50651,	0.50751,	0.50851,	0.5
0951,	0.51051,	0.51151,	0.51251,	0.51351,	0.51451,	0.51
552,	0.51652,	0.51752,	0.51852,	0.51952,	0.52052,	0.521
52,	0.52252,	0.52352,	0.52452,	0.52553,	0.52653,	0.5275
3,	0.52853,	0.52953,	0.53053,	0.53153,	0.53253,	0.5
3353,	0.53453,	0.53554,	0.53654,	0.53754,	0.53854,	0.53
954,	0.54054,	0.54154,	0.54254,	0.54354,	0.54454,	0.545
55,	0.54655,	0.54755,	0.54855,	0.54955,	0.55055,	0.5515
5,	0.55255,	0.55355,	0.55455,	0.55556,	0.55656,	0.5
5756,	0.55856,	0.55956,	0.56056,	0.56156,	0.56256,	0.56
356,	0.56456,	0.56557,	0.56657,	0.56757,	0.56857,	0.569
57,	0.57057,	0.57157,	0.57257,	0.57357,	0.57457,	0.5755
8,	0.57658,	0.57758,	0.57858,	0.57958,	0.58058,	0.5
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759,	0.58859,	0.58959,	0.59059,	0.59159,	0.59259,	0.593
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6,	0.6006,	0.6016,	0.6026,	0.6036,	0.6046,	0.6
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62,	0.61862,	0.61962,	0.62062,	0.62162,	0.62262,	0.6236

2,	0.62462,	0.62563,	0.62663,	0.62763,	0.62863,	0.6
2963,	0.63063,	0.63163,	0.63263,	0.63363,	0.63463,	0.63
564,	0.63664,	0.63764,	0.63864,	0.63964,	0.64064,	0.641
64,	0.64264,	0.64364,	0.64464,	0.64565,	0.64665,	0.6476
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966,	0.66066,	0.66166,	0.66266,	0.66366,	0.66466,	0.665
67,	0.66667,	0.66767,	0.66867,	0.66967,	0.67067,	0.6716
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368,	0.68468,	0.68569,	0.68669,	0.68769,	0.68869,	0.689
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71,	0.71471,	0.71572,	0.71672,	0.71772,	0.71872,	0.7197
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2573,	0.72673,	0.72773,	0.72873,	0.72973,	0.73073,	0.73
173,	0.73273,	0.73373,	0.73473,	0.73574,	0.73674,	0.737
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4,	0.74474,	0.74575,	0.74675,	0.74775,	0.74875,	0.7
4975,	0.75075,	0.75175,	0.75275,	0.75375,	0.75475,	0.75
576,	0.75676,	0.75776,	0.75876,	0.75976,	0.76076,	0.761
76,	0.76276,	0.76376,	0.76476,	0.76577,	0.76677,	0.7677
7,	0.76877,	0.76977,	0.77077,	0.77177,	0.77277,	0.7
7377,	0.77477,	0.77578,	0.77678,	0.77778,	0.77878,	0.77
978,	0.78078,	0.78178,	0.78278,	0.78378,	0.78478,	0.785
79,	0.78679,	0.78779,	0.78879,	0.78979,	0.79079,	0.7917
9,	0.79279,	0.79379,	0.79479,	0.7958,	0.7968,	0.
7978,	0.7988,	0.7998,	0.8008,	0.8018,	0.8028,	0.8
038,	0.8048,	0.80581,	0.80681,	0.80781,	0.80881,	0.809
81,	0.81081,	0.81181,	0.81281,	0.81381,	0.81481,	0.8158
2,	0.81682,	0.81782,	0.81882,	0.81982,	0.82082,	0.8
2182,	0.82282,	0.82382,	0.82482,	0.82583,	0.82683,	0.82
783,	0.82883,	0.82983,	0.83083,	0.83183,	0.83283,	0.833
83,	0.83483,	0.83584,	0.83684,	0.83784,	0.83884,	0.8398
4,	0.84084,	0.84184,	0.84284,	0.84384,	0.84484,	0.8
4585,	0.84685,	0.84785,	0.84885,	0.84985,	0.85085,	0.85
185,	0.85285,	0.85385,	0.85485,	0.85586,	0.85686,	0.857
86,	0.85886,	0.85986,	0.86086,	0.86186,	0.86286,	0.8638
6,	0.86486,	0.86587,	0.86687,	0.86787,	0.86887,	0.8
6987,	0.87087,	0.87187,	0.87287,	0.87387,	0.87487,	0.87
588,	0.87688,	0.87788,	0.87888,	0.87988,	0.88088,	0.881
88,	0.88288,	0.88388,	0.88488,	0.88589,	0.88689,	0.8878
9,	0.88889,	0.88989,	0.89089,	0.89189,	0.89289,	0.8
9389,	0.89489,	0.8959,	0.8969,	0.8979,	0.8989,	0.8
999,	0.9009,	0.9019,	0.9029,	0.9039,	0.9049,	0.905
91,	0.90691,	0.90791,	0.90891,	0.90991,	0.91091,	0.9119


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'sandwich', 49: 'orange', 50: 'broccoli', 51: 'carrot', 52: 'hot dog', 53: 'pizza', 54: 'donut', 55: 'cake', 56: 'chair', 57: 'couch', 58: 'potted plant', 59: 'bed', 60: 'dining table', 61: 'toilet', 62: 'tv', 63: 'laptop', 64: 'mouse', 65: 'remote', 66: 'keyboard', 67: 'cell phone', 68: 'microwave', 69: 'oven', 70: 'toaster', 71: 'sink', 72: 'refrigerator', 73: 'book', 74: 'clock', 75: 'vase', 76: 'scissors', 77: 'teddy bear', 78: 'hair drier', 79: 'toothbrush'}  
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1, 21, 0, 5])  
nt_per_image: array([61, 3, 12, 4, 5, 5, 3, 5, 2, 4, 0, 2, 0, 5,  
2, 4, 9, 1, 0, 0, 4, 1, 2, 4, 4, 4, 9, 6, 2, 5, 1, 2, 6, 2,  
4, 4, 3, 0, 5, 6, 5, 10, 6, 7, 5, 9, 1, 0, 2, 1, 4, 3, 1, 5,  
2, 4, 9, 5, 9, 3, 10, 2, 2, 2, 5, 0, 5, 3, 5, 0, 4, 5, 6,  
8, 2, 1, 6,  
0, 2])  
results_dict: {'metrics/precision(B)': 3.0744941626158125e-05, 'metrics/recall(B)': 0.004103360319396695, 'metrics/mAP50(B)': 9.306684217747665e-05, 'metrics/mAP50-95(B)': 2.424994080045148e-05, 'fitness': 3.1131630938154e-05}  
save_dir: WindowsPath('runs/detect/train3')  
speed: {'preprocess': 1.5901382812497644, 'inference': 108.20665312499943, 'loss': 0.00010937499972385467, 'postprocess': 115.2086492187494}  
stats: {'tp': [], 'conf': [], 'pred_cls': [], 'target_cls': [], 'target_img': []}  
task: 'detect'
```

In [5]: `!pip install ultralytics`

```
Requirement already satisfied: ultralytics in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (8.3.189)
Requirement already satisfied: numpy>=1.23.0 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from ultralytics) (2.0.2)
Requirement already satisfied: matplotlib>=3.3.0 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from ultralytics) (3.9.4)
Requirement already satisfied: opencv-python>=4.6.0 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from ultralytics) (4.12.0.88)
Requirement already satisfied: pillow>=7.1.2 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from ultralytics) (11.3.0)
Requirement already satisfied: pyyaml>=5.3.1 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from ultralytics) (6.0.2)
Requirement already satisfied: requests>=2.23.0 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from ultralytics) (2.32.5)
Requirement already satisfied: scipy>=1.4.1 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from ultralytics) (1.13.1)
Requirement already satisfied: torch>=1.8.0 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from ultralytics) (2.8.0)
Requirement already satisfied: torchvision>=0.9.0 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from ultralytics) (0.23.0)
Requirement already satisfied: psutil in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from ultralytics) (7.0.0)
Requirement already satisfied: py-cpuinfo in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from ultralytics) (9.0.0)
Requirement already satisfied: polars in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from ultralytics) (1.32.3)
Requirement already satisfied: ultralytics-thop>=2.0.0 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from ultralytics) (2.0.16)
Requirement already satisfied: contourpy>=1.0.1 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from matplotlib>=3.3.0->ultralytics) (1.3.0)
Requirement already satisfied: cycler>=0.10 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from matplotlib>=3.3.0->ultralytics) (0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from matplotlib>=3.3.0->ultralytics) (4.59.2)
Requirement already satisfied: kiwisolver>=1.3.1 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from matplotlib>=3.3.0->ultralytics) (1.4.7)
Requirement already satisfied: packaging>=20.0 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from matplotlib>=3.3.0->ultralytics) (25.0)
Requirement already satisfied: pyparsing>=2.3.1 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from matplotlib>=3.3.0->ultralytics) (3.2.3)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from matplotlib>=3.3.0->ultralytics) (2.9.0.post0)
Requirement already satisfied: importlib-resources>=3.2.0 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from matplotlib>=3.3.0->ultralytics) (6.5.2)
Requirement already satisfied: zipp>=3.1.0 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from importlib-resources>=3.2.0->matplotlib>=3.3.0->ultralytics) (3.23.0)
Requirement already satisfied: six>=1.5 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from python-dateutil>=2.7->matplotlib>=3.3.0->ultralytics) (1.17.0)
Requirement already satisfied: charset_normalizer<4,>=2 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from requests>=2.23.0->ultralytics) (3.4.3)
Requirement already satisfied: idna<4,>=2.5 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from requests>=2.23.0->ultralytics) (3.10)
Requirement already satisfied: urllib3<3,>=1.21.1 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from requests>=2.23.0->ultralytics) (2.5.0)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from requests>=2.23.0->ultralytics) (2025.8.3)
Requirement already satisfied: filelock in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from torch>=1.8.0->ultralytics) (3.19.1)
```

```
Requirement already satisfied: typing-extensions>=4.10.0 in c:\users\hp\anaconda3\nv\envs\yolo_env\lib\site-packages (from torch>=1.8.0->ultralytics) (4.15.0)
Requirement already satisfied: sympy>=1.13.3 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from torch>=1.8.0->ultralytics) (1.14.0)
Requirement already satisfied: networkx in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from torch>=1.8.0->ultralytics) (3.2.1)
Requirement already satisfied: jinja2 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from torch>=1.8.0->ultralytics) (3.1.6)
Requirement already satisfied: fsspec in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from torch>=1.8.0->ultralytics) (2025.7.0)
Requirement already satisfied: mpmath<1.4,>=1.1.0 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from sympy>=1.13.3->torch>=1.8.0->ultralytics) (1.3.0)
Requirement already satisfied: MarkupSafe>=2.0 in c:\users\hp\anaconda3\envs\yolo_env\lib\site-packages (from jinja2->torch>=1.8.0->ultralytics) (3.0.2)
```

```
In [12]: from ultralytics import YOLO
```

```
model = YOLO("yolov8n.pt") # Load pre-trained YOLO model
```

```
In [13]: from ultralytics import YOLO
```

```
In [14]: model = YOLO("yolov8n.pt") # downloads and loads YOLOv8 nano
```

```
In [ ]: # Run detection
results = model(r"C:\Users\HP\Documents\YOLO_Object_Detection\images\dog.jpg")

# Show results in a window
results[0].show()

# Save results (YOLO will automatically create 'runs/detect/predict' folder)
results[0].save()
```

```
image 1/1 C:\Users\HP\Documents\YOLO_Object_Detection\images\dog.jpg: 448x640 1 dog, 165.0ms
```

```
Speed: 2.6ms preprocess, 165.0ms inference, 2.4ms postprocess per image at shape (1, 3, 448, 640)
```

```
Out[ ]: 'results_dog.jpg'
```

```
In [ ]:
```